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## **Total Factor Productivity as a Measure of Operational Efficiency**

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## Table of Contents

EXECUTIVE SUMMARY .....	1
INTRODUCTION.....	1
POSTAL SERVICE TFP METHODS.....	2
COMPARISON OF TFP WITH OTHER PROPOSED MEASURES OF OPERATIONAL EFFICIENCY .....	4
TFP DOES NOT UNCOVER THE SOURCES OF PRODUCTIVITY IMPROVEMENT, NOR DOES IT INDICATE WHAT TFP INCREASES ARE ACHIEVABLE .....	5
INCREASES IN TFP LEAD TO COST REDUCTIONS, BUT NET INCOME IS AFFECTED BY VARIOUS OTHER FACTORS BEYOND THE CONTROL OF THE POSTAL SERVICE .....	6
THE POSTAL SERVICE HAS INCREASED TFP AS VOLUMES HAVE DECLINED .....	7
POSSIBILITIES FOR FUTURE TFP GAINS.....	9
CONCLUSION .....	9

## Total Factor Productivity as a Measure of Operational Efficiency

### EXECUTIVE SUMMARY

The Postal Service retained Christensen Associates to provide an evaluation of total factor productivity (TFP) as a measure of operational efficiency. In its *Advance Notice of Proposed Rulemaking* (Advance Notice), the Postal Regulatory Commission (PRC) lists various options for measuring operational efficiency, including TFP.<sup>1</sup> TFP is a comprehensive measure of operational efficiency. TFP is a measure that compares the level of workload (weighted mail volume, miscellaneous output, and delivery points) to the level of resource usage (all labor, materials, and capital used in the provision of those services). TFP increases when workload increases more rapidly than resource usage increases, or when workload decreases less rapidly than resource usage decreases. In terms of considering the Postal Service's operational efficiency, TFP is a robust measure that fully captures the complexities of Postal Service workload and resource usage, as compared to real unit operating costs, workhours, and simpler productivity measures such as the number of pieces per workhour or the number of delivery points per workhour.

While TFP is a comprehensive measure of operational efficiency, TFP does not determine the sources of productivity improvements, nor does it indicate what TFP increases are achievable. TFP is a "top-down" measure of operational efficiency; it does not provide a "benchmark" that specifies the degree to which TFP can increase if best practices are adopted. Furthermore, TFP in most industries has substantial year-to-year variations due to business cycles, the pattern of investment in new technologies, and strategic changes in business plans. When using TFP as an evaluation tool of management, it is important to look at TFP trends over several years rather than isolated annual TFP results.

Furthermore, TFP is only one factor underlying trends in net income. TFP can increase in periods where net income decreases (and *vice versa*) because of other trends facing the Postal Service. One trend that has been important in recent years is the decline in mail volume, particularly among those products that have relatively high markups over their attributable costs. Postal Service TFP has increased substantially during the PAEA years even though the Postal Service suffered substantial losses. On the other hand, TFP growth during the PAEA period lagged TFP growth immediately prior to PAEA, indicating that there is no evidence that PAEA led to greater productivity gains.

The Alvarez and Marsal report<sup>2</sup> identifies areas in which the Postal Service may achieve cost reductions. If the initiatives discussed in the report are successfully implemented, they will also increase Postal Service TFP. However, as Alvarez and Marsal note, improvements in many of these areas will require the cooperation of the Postal Service labor unions.

### INTRODUCTION

Total factor productivity, sometimes called multifactor productivity, is a comprehensive measure of economic efficiency. The earliest total factor productivity studies were designed to understand the

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<sup>1</sup> Postal Regulatory Commission, *Advance Notice of Proposed Rulemaking* on the Statutory Review of the System for Regulating Rates and Classes for Market Dominant Products, Docket No. RM2017-3, Issued December 20, 2016, p. 4.

<sup>2</sup> "PRC Ten-Tear Review – Cost Efficiency Study," prepared by Alvarez and Marsal with the Institute for Supply Management, March 20, 2017.

sources of economic growth,<sup>3</sup> but the scope of total factor productivity (TFP) studies expanded to include the analysis of industry and company trends. Later, John Kendrick and Ephraim Sudit, among others, developed analytical frameworks that permit the analysis of company performance in terms of TFP.<sup>4</sup>

In 1983, the United States Postal Service commissioned Christensen Associates to develop a measure of TFP that could be used to evaluate Postal Service performance. Under the direction of Professor Laurits R. Christensen, who had previously developed TFP measures for the railroad, airlines, and telecommunications industries, Christensen Associates developed a TFP measure applicable to the Postal Service. This TFP measure relies on a variety of Postal Service data systems and a variety of public data sources. In 1985, the Postal Service adopted TFP as its productivity performance measure. The methods underlying the Postal Service TFP measure were published by Dianne Christensen, et al.<sup>5</sup> The methods described in that paper have consistently been the basis for the TFP measure since its adoption. Over the years, the Postal Service has made changes to its data systems and there have been significant changes to the various public data systems. As these changes have occurred, the ways in which the TFP methods are implemented have changed accordingly, but the underlying conceptual framework has remained the same. In the following paragraphs, we describe the TFP methods.

## POSTAL SERVICE TFP METHODS

Postal Service *TFP* is the ratio of Postal Service workload to Postal Service resource usage. When Postal Service workload increases more rapidly than Postal Service resource usage increases (or when workload decreases less rapidly than resource usage decreases), TFP increases: in other words, TFP growth is positive. Recently, Postal Service TFP growth has been positive in most years since 2000, because the Postal Service has been able to substantially decrease resource usage.

*Workload* has three components: weighted mail volume, miscellaneous output, and the size of the Postal Service network (measured by the number of delivery points). *Weighted mail volume* is an index that represents the amount of mail (the various types of letters, flats, and parcels) handed by the Postal Service. The weighted mail volume measure distinguishes 36 different Postal Service “products.” The number of different product lines in weighed mail volume is determined by the level of detail provided in the Revenue, Pieces, and Weight (RPW) reports, the Cost and Revenue Analysis (CRA) reports, and the International Cost and Revenue Analysis (ICRA) reports. To obtain a weighted mail volume index, the number of pieces in each product group is “weighted” by the relative level of effort required to provide that product, as measured by the CRA and ICRA. For example, if the cost per piece for one product group is twice as great as the cost per piece for a second product group, then each piece in the first product group is ascribed twice as much weight as each piece in the second product group.

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<sup>3</sup> Some examples of these early total factor productivity studies include Moses Abramovitz, “Resource and Output Trends in the United States Since 1870,” *American Economic Review*, Vol. 46, No. 2 (1956), pp. 762-782; Robert M. Solow, “Technical Change and the Aggregate Productivity Function,” *Review of Economics and Statistics*, Vol. 39, No. 3 (1957), pp. 312-320; and Dale W. Jorgenson and Zvi Griliches, “The Explanation of Productivity Change,” *Review of Economic Studies*, Vol. 34, No. 3 (1967), pp. 249-280.

<sup>4</sup> See John W. Kendrick, *Improving Company Productivity: Handbook with Case Studies* (Johns Hopkins University Press, 1984); and Ephraim F. Sudit, *Productivity Based Management*, (Kluwer-Nijhoff, 1984).

<sup>5</sup> Dianne C. Christensen, Laurits R. Christensen, Charles E. Guy, and Donald J. O’Hara, “U.S. Postal Service Productivity: Measurement and Performance,” in Michael A. Crew and Paul F. Kleindorfer, eds., *Regulation and the Nature of Postal and Delivery Services*, (Kluwer Academic Publishers, 1993), pp. 237-255.

*Miscellaneous Output* is a comprehensive measure of the other services provided by the Postal Service. Sixteen services are distinguished in miscellaneous output. Some of these services are distinguished as ancillary services and special services in the RPW, but there are additional income-generating activities that are also included in miscellaneous output. Conceptually, revenue generated by mail in weighted mail volume plus the revenue generated by the miscellaneous outputs equals Postal Service total revenue less a few adjustments (such as gains or losses on sales of buildings or adjustments to the Postage-in-the-Hands-of-the-Public estimates).

The third component of workload is the size of the Postal Service network as measured by the number of *Delivery Points*. The delivery-point measure includes the number of city deliveries, the number of rural deliveries, and the number of highway contract deliveries.<sup>6</sup> Christensen, et al. reports that the Postal Service has significant economies of density.<sup>7</sup> That is, for a given amount of total mail volume, it is costlier when that mail is delivered to a large postal network than when it is delivered to a small postal network. Equivalently, it is less costly when an increase in mail volume is due to an increase in the number of mail pieces per delivery point than when an increase in mail volume is due to an increase in the number of delivery points being served (with the volume per delivery point remaining constant). Therefore, for a given number of delivery points, average cost decreases as the number of mail pieces delivered to those delivery points increases, and *vice versa*. Conversely, for a given amount of mail volume, average cost increases as the number of delivery points increases, and *vice versa*. By including the delivery-point measure in the workload measure, TFP addresses the issue of economies of density.

*Resource Usage* is the amount of labor, materials, and capital being used to handle Postal Service workload. The resource usage index is derived from a quantity index for labor, a quantity index for materials, and a quantity index for capital.

The quantity index of *labor* is based on a breakdown of employees and workhours into 85 different groups, based on occupation, whether the employee is a career employee or a non-career employee, and the employee's postal experience. Data from a variety of Postal Service data systems are used to construct quantity indexes and price indexes for the 85 labor groups. The quantity index of total labor input is then derived by aggregating the quantity indexes for the 85 groups, using a standard economic indexing technique, the Tornqvist index.<sup>8</sup> As part of this process, a price of labor is also derived, where the price of labor is equal to the total cost of labor divided by the labor quantity index.<sup>9</sup>

The quantity index of *materials* is based on a breakdown of materials, energy, and services into 28 categories. Accounts from the National Consolidated Trial Balance are mapped to these categories based on the similarity of their properties. Relevant price indexes are next selected for each of the 28 categories, and quantity indexes for each category are obtained by dividing the Postal Service expenses mapped to that category by the relevant price index. The quantity index of total materials is then

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<sup>6</sup> The number of post office boxes and the services provided by them are included in miscellaneous output and, consequently, are not included in the delivery point measure.

<sup>7</sup> Christensen, et. al., op. cit., p. 248.

<sup>8</sup> The Bureau of Labor Statistics also uses the Tornqvist index in the development of its total factor productivity measures.

<sup>9</sup> It is important to note that quantity of labor is built up from employee workhours and employee counts. Various labor related costs such as the mandated prefunding of retiree health benefits are part of the price of labor and not the quantity of labor. Consequently, those costs do not have a material impact on TFP.

derived from the quantity indexes of the 28 materials input groups using the Tornqvist index, and a price of materials is residually determined.

The quantity index of *capital* distinguishes seven types of plant and equipment and distinguishes whether capital is owned or rented by the Postal Service. The procedures for calculating quantity indexes for rented assets are like the procedures for computing the materials quantity indexes: costs are derived from the National Consolidated Trial Balance, relevant price indexes are obtained, and the quantity indexes are obtained by dividing costs by the price index. For assets owned by the Postal Service, methods initially developed by Christensen and Jorgenson<sup>10</sup> are used to impute rental values and construct capital input quantity and price indexes. As with labor and materials, the quantity index of total capital is derived from the quantity indexes of the different types of capital using the Tornqvist index, and a price of capital is residually determined.

The resource usage index is derived from the quantity index for total labor, the quantity index for total materials, and the quantity index for total capital, using the Tornqvist index. Since the Postal Service is a labor-intensive organization, trends in the labor quantity index have the greatest impact on trends in resource usage, followed by trends in the materials quantity index and trends in the capital quantity index.

## **COMPARISON OF TFP WITH OTHER PROPOSED MEASURES OF OPERATIONAL EFFICIENCY**

The PRC Advance Notice lists a set of potential operational efficiency measures in addition to TFP: real unit operating costs, simpler productivity measures, and total workhours. Each of these alternative measures have deficiencies in terms of measuring Postal Service operational efficiency trends, when compared to TFP.

While useful for some purposes,<sup>11</sup> simpler productivity measures - such as the pieces per workhour or the number of delivery points served per workhour - do not fully capture the complexity of Postal Service workload or the other resources used to provide postal services. Before TFP was adopted in 1985, the Postal Service relied on pieces per workhour as its productivity measure. A primary failing of that measure was that it did not capture the trends in increased worksharing that were occurring at that time and consequently was overstating the growth in Postal Service productivity. A second reason why pieces per workhour was an inferior measure was that outsourcing activities previously done by the Postal Service would lead to an increase in that productivity measure, even if it were costlier to outsource the job instead of doing it in-house.

A simple workhour measure is also not a comprehensive measure of efficiency like TFP because it is not compared to any measure of Postal Service workload. An increase in workhours might be associated with an increase in productivity if there was a significant increase in workload, while a decrease in workhours might be associated with a decrease in productivity if workload was decreasing more rapidly.

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<sup>10</sup> Laurits R. Christensen and Dale W. Jorgenson, "The Measurement of U.S. Real Capital Input, 1929-1967," *Review of Income and Wealth*, Vol. 16, No. 1 (1969) pp. 293-320.

<sup>11</sup> The Postal Service introduced deliveries per workhour as a measure of productivity in its annual performance plans, because it considered the metric to be more versatile tool for managing and motivating performance at the functional and unit levels. Postal Service 2010 Annual Performance Report and 2011 Annual Performance Plan at 7.

We understand real operating cost to be total operating expense divided by either a general price index (e.g., the CPI) or a price index specific to the resources used by the Postal Service, and real unit operating cost to be real operating cost divided by some measure of output. It should be noted that if operating expenses were divided by a price index reflecting the resources used by the Postal Service, and if the output measure captured all the elements of workload as the TFP workload index does, then trends in real unit operating cost would reflect trends in TFP: increases in TFP would be paired with decreases in real unit operating costs.<sup>12</sup>

### **TFP DOES NOT UNCOVER THE SOURCES OF PRODUCTIVITY IMPROVEMENT, NOR DOES IT INDICATE WHAT TFP INCREASES ARE ACHIEVABLE**

TFP is a “top-down” measure that captures the overall improvement in Postal Service economic efficiency, but it does not attribute that productivity improvement to specific programs or initiatives. Furthermore, while TFP shows what efficiency improvements have been made, it does not indicate what improvements are achievable. To understand the sources of TFP gains, or to estimate what TFP gains are achievable, studies such as that submitted by Alvarez and Marsal are valuable. Estimated cost savings from efficiency improvements can be used to estimate expected TFP increases.

In most industries, there are significant year-to-year variations in TFP growth. The rates of TFP growth in these other industries generally change over the business cycle, with TFP growth being the greatest in years when output growth is strongest. There are several reasons for this. First, firms cannot fine-tune their capital inputs to different phases of the business cycle. Once investment decisions are made and capital is put in place, it is less costly for the firm to keep that plant and equipment during the low growth periods rather than sell it off. Second, firms often decide to keep staffing levels up during slow growth periods to avoid the cost of hiring new employees once the economy recovers. The cyclical nature of TFP growth can be seen in the official statistics of the Bureau of Labor Statistics for the private nonfarm business sector. Since 1988, output growth and total factor productivity growth have been positively correlated, with a correlation coefficient of 0.56. During the Great Recession, output decreased a cumulative 5.5% during 2008 and 2009, and total factor productivity decreased a cumulative 1.7%.<sup>13</sup>

A second reason there can be significant year-to-year variations in TFP is the timing of investments in new technology. Investments in these technologies may occur well before the benefits of those investments are realized. TFP growth may be small or negative when the investments are made, but substantial TFP increases begin to occur once the technologies are fully employed. This can be particularly true when the new technologies are not fully used to capacity in the beginning years, but as output increases the cost savings from the new technologies are realized and TFP increases.

A third reason is that businesses may find that they must reorganize and shift their emphasis across different product lines. This process may suppress TFP growth in the short-run but increase TFP in the long-run. Additionally, the rate at which a company can increase its TFP may be a function of how close it is to achieving “best practice.” Firms that have substantial levels of inefficiency can increase their TFP

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<sup>12</sup> There would not be a one-to-one mapping, however. Operating expenses do not fully reflect the costs of capital inputs, and some operating expenses do not reflect current economic activity.

<sup>13</sup> The data used in this analysis come from Bureau of Labor Statistics “Historical Multifactor Productivity Measures (SIC 1948-87 linked to NAICS 1987-2015),” released May 18, 2016 at <https://www.bls.gov/mfp/mprdownload.htm>.

by moving closer to best practice, while firms that are already employing best practice will not have the same opportunities.<sup>14</sup>

Because TFP by itself does not show what productivity gains are achievable, it is not possible to conclude that the TFP increase in any one year is essentially “good” or “bad” without further information on what productivity gains are achievable, whether a firm is strategically sacrificing short-run productivity gains to achieve longer-run productivity gains, or whether unexpected changes in business conditions have led to a slowdown in TFP growth. It is more useful to evaluate TFP performance over several years instead of on a year-by-year basis for the reasons listed above.<sup>15</sup>

### **INCREASES IN TFP LEAD TO COST REDUCTIONS, BUT NET INCOME IS AFFECTED BY VARIOUS OTHER FACTORS BEYOND THE CONTROL OF THE POSTAL SERVICE**

Since increases in TFP lead to reductions in resources being used to handle Postal Service workload, those TFP increases also lead to cost reductions and increases in Postal Service net income. As a rough rule of thumb, a one-time TFP increase of one percentage point reduces Postal Service costs by \$700 million (all other things being equal). If there is no subsequent increase or decrease in TFP, the cost level continues to remain \$700 million below what it would have been had the TFP increase not taken place. A corollary to this observation is that in order to continually increase TFP, the Postal Service must continue to find new ways to reduce costs.

On the other hand, net income is affected by several factors besides TFP, and TFP can increase during periods when net income is decreasing. These additional factors are largely outside the control of the Postal Service. One factor is costs imposed on the Postal Service that are not related to current economic activity, such as the required pre-funding of retiree health benefits. Rate increases can increase Postal Service revenue and net income, but these are either limited by the price cap or determined in competitive markets. The prices that the Postal Service pays for the resources it uses are also largely outside the control of the Postal Service. Postal Service labor rates are set through a collective bargaining/arbitration process that is legislatively mandated. The prices the Postal Service pays for its other resources are determined by competitive markets, and the Postal Service does not have substantial monopsony power in those markets. Neither the impact of rate increases nor changes in the prices paid by the Postal Service for the resources it uses will affect TFP, but both affect net income.<sup>16</sup>

Furthermore, lost mail volume will lead to net income losses even when TFP is increasing. This is because Postal Service rates must be set above their products’ marginal costs to cover institutional costs. When mail volume decreases, revenue decreases more rapidly than cost, leading to reductions in net income. According to the FY 2016 Cost and Revenue Analysis, 53% of Postal Service costs are “volume variable.” If Postal Service mail and services volume were to decrease by 1% across the board,

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<sup>14</sup> TFP increases may also be limited by regulatory or legal constraints, such as CO2 emission limits on coal-generation plants. While the emission limits may be desirable from a social welfare perspective, they also can have the side effect on limiting electric utility TFP growth.

<sup>15</sup> For example, Kendrick suggests that TFP be looked at over a five- to ten-year period when evaluating management performance, though he also advocates frequent monitoring of TFP and inclusion of TFP concepts in the budget setting process. See Kendrick, *op. cit.*, p. 53.

<sup>16</sup> Changes in labor rates will not affect the quantity of labor input measures for each labor input category but may have small secondary effects on the aggregation of those categories due to changes in their cost shares.



costs would only decrease by 0.53%, while revenue would decrease 1%. As the mail volume decreases become larger, the net income losses become larger.

Furthermore, the difference between the price of a Postal Service product and its attributable cost varies by product. A 2012 report by the OIG noted that between FY 2000 and FY 2010, there was a significant shift in the composition of total mail volume from mail that had large markups of price over attributable cost to mail with lower markups. These markups, which are called “contribution” in the Cost and Revenue Analysis reports, allow the Postal Service to cover institutional costs. This report showed that while the number of mail pieces per delivery point decreased 27% between FY 2000 and FY 2010, the contribution-weighted pieces per delivery point decreased 32%.<sup>17</sup> Since FY 2010, volume declines have continued to shift the mail volume mix for the market-dominant basket from higher-contribution products to lower-contribution products. Between FY 2010 and FY 2015, First-Class mail, which on average has a contribution of 25.7 cents per piece of mail, decreased 21%, while Standard Mail, with an average contribution of 8.0 cents per piece of mail, decreased only 2%.

As is noted below, the large net income losses sustained by the Postal Service during the PAEA era do not reflect poor TFP performance. Rather, these losses were sustained even though Postal Service TFP increased during this period. The other factors listed above were the driving factors leading to substantial Postal Service financial losses.

#### **THE POSTAL SERVICE HAS INCREASED TFP AS VOLUMES HAVE DECLINED**

Critics of the Postal Service might argue that the Postal Service’s financial losses over the past ten years were due to relatively poor performance, but this is simply not true. The Postal Service has been able to grow TFP in a sustained fashion since 2000, due to reductions in resource usage. The Postal Service continued this productivity growth over the past ten years, even as workload has declined. In most industries, it is easier to increase TFP when the workload for that industry increases, the reason being that the amount of resources being used can increase as long as the increase is less than the increase in workload. Conversely, it is difficult to increase TFP when workload is stagnant or decreasing because the firm must actually cut the resources being used proportionately more. The converse happens to be the case for the Postal Service. The top panel of Table 1 shows Postal Service TFP growth over three periods: 1971-2000, 2000-2007, and 2007-2015.

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<sup>17</sup> *State of the Mail*, United States Postal Service Office of Inspector General, Report Number: RARC-WP-12-010, April 27, 2012, p. 22.

<b>Table 1</b>			
Postal Service Average Annual Growth Rates			
Period (Fiscal Years)	Workload Growth	Resource Usage Growth	TFP Growth
1971-2000	1.5%	1.2%	0.3%
2000-2007	0.1%	-1.3%	1.4%
2007-2015	-2.5%	-3.1%	0.6%
Private Nonfarm Business Sector Average Annual Growth Rates			
Period	Total Output Growth	Total Input Growth	TFP Growth
1971-2000	3.6%	2.9%	0.8%
2000-2007	2.8%	1.4%	1.4%
2007-2015	1.3%	0.9%	0.4%

Up until FY 2000, the Postal Service had moderate increases in workload but resource usage was increasing at almost the same rate, and there were small increases in TFP on average during that period. Between FY 2000 and FY 2007, the Postal Service had little workload growth but was able to reduce resource usage considerably and TFP increased at a robust 1.4% per year. After FY 2007, workload started declining at a rapid rate, and although TFP during this latter period was not able to match TFP growth during the FY 2000 through FY 2007 period, it still increased at a significant annual rate of 0.6% per year.

The average annual rate of TFP growth between 2007 and 2015 (0.6%) cumulates to 4.8% over that period. As a one percentage point increase in TFP translates into roughly a \$700 million reduction in cost, those TFP gains meant that Postal Service costs were approximately \$3.4 billion lower in FY 2015 than what they would have been had the productivity gains since 2007 not taken place.

Traditionally, Postal Service TFP has been benchmarked against private nonfarm business TFP, but in recent years this comparison has become less useful because the U.S. economy has become more heavily weighted with high technology goods and services. Productivity growth in the high-tech sector far outstrips that of the industrial and service sectors that are more akin to the Postal Service. One must keep in mind this difference when comparing Postal Service TFP growth with private nonfarm business sector TFP growth. The bottom panel of Table 1 summarizes the private nonfarm business sector TFP growth rates over the same three periods.

Comparing the numbers in these two tables we see that between 1971 and 2000, Postal Service TFP growth lagged considerably behind TFP growth in the private nonfarm business sector. During the 2000-2007 period, Postal Service TFP growth matched TFP growth in the private nonfarm business sector. But it is important to note that during this period, private nonfarm business sector output growth was a relatively robust 2.8% while Postal Service workload growth was stagnant. Since 2007, Postal Service TFP

growth has outpaced that of the private nonfarm business sector despite the fact that output in the private nonfarm business sector was growing while Postal Service workload was declining.

While the Postal Service productivity record since 2000 has been commendable, one cannot simply use that performance as a benchmark for future years. As mentioned above, the rate at which the Postal Service is able to increase TFP is dependent upon a number of factors which can change over time, including workload trends, capital investments, and the ability of the Postal Service to implement initiatives to capture additional cost savings. Over the past sixteen years, the Postal Service was able to make substantial progress in automating letter processing and mechanizing parcel sortation. These innovations made it possible for the Postal Service to reduce costs and increase TFP. A second factor that likely led to Postal Service TFP gains was the fact that the Postal Service was able to achieve significant flexibility in its utilization of its labor force through new contracts with its unions. These labor agreements have allowed the establishment of new “non-career” employee classifications, which allow the Postal Service to utilize their workforce in more flexible and less costly ways. The 2010 collective bargaining agreement with the American Postal Workers Union established a non-career category of clerks called Postal Support Employees. Subsequent contracts with the National Association of Letter Carriers and the National Postal Mail Handlers Union established City Carrier Assistants and Mail Handler Assistants, respectively. By FY 2016, non-career employees made up 20% of the Postal Service workforce.<sup>18</sup> While the Postal Service may be able to continue to substitute these non-career employees for retiring career employees over the next few years, the gains from these particular agreements will eventually diminish and new sources of productivity improvements will have to be found. While cost reduction initiatives like Network Rationalization will potentially create one-time increases in TFP, continued TFP growth will require additional initiatives in the future. Furthermore, the impact of such initiatives will need to be evaluated with regard to their impact on quality of service in order to conclude that those initiatives are in the public interest.

## **POSSIBILITIES FOR FUTURE TFP GAINS**

Alvarez and Marsal point to a variety of areas in which the Postal Service may be able to reduce costs in the future, which generally constitute areas that the Postal Service has already identified.<sup>19</sup> Many of the identified cost reductions will also translate into TFP gains. Alvarez and Marsal note, however, that while some of these changes are fully under the control of Postal Service management, others will require buy-in by Postal Service labor unions. The Alvarez and Marsal report emphasizes the point that the rate of future Postal Service TFP growth is not fully under the control of Postal Service management, but will also be dependent on other parties.

## **CONCLUSION**

Our analysis leads to the following conclusions:

- TFP as an operational efficiency measure is more comprehensive than the other measures suggested by the PRC.
- TFP is a top-down productivity measure and cannot pinpoint where the productivity gains occurred. TFP also does not indicate how much productivity improvement is achievable.

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<sup>18</sup> United States 2016 Postal Service Annual Report to Congress, p. 2.

<sup>19</sup> Alvarez and Marsal, o. cit., pp. 2-5.

- TFP has significant year-to-year variations, and there may be good reasons why TFP growth is low or negative in some years. When evaluating TFP improvement, it is important to look at longer periods of time.
- While TFP increases have a positive impact on net income, there are other factors important to net income changes. Net income can decrease when TFP increases, or *vice versa*.
- TFP growth has been significant since the implementation of PAEA, but has not been as large as TFP growth in the years prior to PAEA, suggesting that volume trends, rather than PAEA, have been the dominant factors in determining the rate of Postal Service TFP growth.
- Since 2006, Postal Service TFP growth has been more rapid than TFP growth in the private nonfarm business sector, even though private nonfarm business sector output was increasing and Postal Service workload was decreasing.
- The Alvarez and Marsal report outlines areas where the Postal Service may be able to increase Postal Service TFP in the future. As that report states, limited actions can be undertaken unilaterally by Postal Service management, but others will require the cooperation of labor unions.